

# INSTITUTE OF ACTUARIES OF INDIA

## EXAMINATIONS

30<sup>th</sup> October 2009

**Subject ST5 — Finance and Investment A**

**Time allowed: Three hours (9.45\* – 13.00 Hours)**

**Total Marks: 100**

### INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions on the front page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception*
2. *\* You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the answer sheet until instructed to do so by the supervisor*
4. *The answers are not expected to be any country or jurisdiction specific. However, if Examples/illustrations are required for any answer, the country or jurisdiction from which they are drawn should be mentioned.*
5. *Attempt all questions, beginning your answer to each question on a separate sheet.*
6. *Mark allocations are shown in brackets.*

**AT THE END OF THE EXAMINATION**

**Please return your answer book and this question paper to the supervisor separately.**

- Q 1)** A trader owns gold as part of an investment portfolio. The trader can buy 10 grams of gold at Rs. 15,000 and sell 10 grams at Rs. 14,000. The trader can borrow funds at 8% per year and invest funds at 7.5% per year (both interest rates are expressed annual compounding).

Determine the range of 1-year forward prices of gold for which the trader has no arbitrage opportunities. Assume there is no bid-offer spread for forward prices.

[5]

- Q 2)** The government of a developed country has announced a stimulus package to protect under privileged population of the country. This has resulted in a large budgetary deficit and the currency of the country is under extreme pressure, which is a cause of concern to the government. Hence the government has given powers to the central bank to control the situation.

i) List the aspects of the economy that a Central Bank may have control over. (3)

ii) The Head of the Central Bank has mentioned in his key note address that he will use the mechanism of influencing short term interest rates in order to protect the currency.

Discuss how this can be achieved. You may assume that the Central Bank has the appropriate powers. (4)

[7]

- Q 3)** i) Give formulae for two methods of risk-adjusted performance analysis that uses the beta of the fund. (2)

ii) You are being interviewed for the position of an Investment Actuary by the CFO of a Mutual Fund Company that has two kinds of investors namely value investors and growth investors. You have been given the following data regarding Investment A and Investment B.

Analyze both the investment opportunities making suitable calculations and advise which investment suits which kind of investor, explaining why.

	Investment A	Investment B	Index
Average Return	18%	18%	15%
Standard Deviation	22%	65%	20%
Correlation Coefficient with NSE-50	0.75	0.35	1

The risk-free rate of return over the same period is 10%. (10)

[12]

- Q 4)** (i) The CFO of your company has come across a note on Economic Capital and has noted the following terminologies and has asked you to explain the same.

- Risk-Neutral Vs Real – World
- Implied Volatilities
- Value at Risk (VaR)
- Stress Testing
- Back Testing

(10)

- ii) An ABC Investments Limited is considering a portfolio consisting INR 500m in investment in Gold Fund and INR 400 m in a Global Fund. The daily volatilities of these funds are given as 1.5% and 1.8% respectively and the coefficient of correlation between their returns is 0.6.
- a) Determine the 10-day 99% VaR for the portfolio.
- b) Determine by how much the diversification reduces the VaR of the portfolio. (6)
- [16]

**Q 5)** You are the newly appointed investment manager of a large Life Insurance Company writing only unit – linked business. The company offers Equity and Debt Funds. The equity strategy of the company has so far been investing in constituent companies forming NIFTY -50.

According to the Marketing Director the company has a very poor reputation with regard to equity fund performance as the investment strategy is too cautious. He has suggested that investment should be expanded into mid-cap, small cap and start-up companies to enhance the returns.

- i) Outline the key risks faced by a Life Insurance Company. (4)
- ii) Discuss the suggestion made by the Marketing Director bringing out the key advantages and disadvantages of the proposed suggestion . (8)
- [12]

**Q 6)** ABC is a leading housing finance company in India that lends primarily for construction and renovation of houses. The tenor of the loans ranges from minimum 5 years to 25 years. The loan amount lent is about Rs.25,000 as at the end of FY 2008-09. The company is contemplating various options to increase the funds for lending in the housing sector. The CFO has advised that the company should look at securitization of its housing loans by issuing Mortgage Backed Securities (MBS) to raise funds in addition to the current practice of raising funds by issuing unsecured bonds with a tenor of 5 to 10 years. The company has been consistently rated AAA.

- a) Explain the key features of securitization of mortgage loans and compare the features with the unsecured bonds which the company has been issuing for funding purposes. (8)

The company has decided to issue MBS by securitizing a part of the portfolio and appointed an investment banker to advise on the structure of the MBS. The investment banker has advised to issue three types of MBS with a tenor of 10 years namely - Senior Debt, Subordinated Debt and Equity. The debt tranches will be sold to investment institutions like banks while the equity tranche will be purchased by the finance company.

The finance company has decided to earmark Rs.2000 Cr. of its assets for issuing MBS through a Special Purpose Vehicle (SPV). The mortgage loans to be securitized have an outstanding term of at least 10 years. The total funds expected to be raised by the company are Rs.1850 Cr. The SPV will issue MBS for Rs.2000 Cr. and provide the same money to the company on the strength of assets for Rs.2000Cr which will be transferred to the SPV.

The size of each tranche is as follows:

Senior Debt           Rs. 1500 Cr.

Subordinated Debt   Rs. 400 Cr.

Equity                 Rs. 100 Cr.

- b)** Explain why the investment banker had advised the above structure with a recommendation for the company to buy the equity tranche with the likely yield differences among the three tranches. (7)
- c)** Discuss the risks the MBS holders face when they subscribe to these investments. (10)

**[25]**

**Q 7)** You are a fund manager in one of the mutual fund houses that is going to launch an equity fund that invests in both national and international equities. The mutual fund states in its prospectus that it would hedge the foreign currency risk completely by using either forwards or futures.

- a)** Bring out clearly the key differences between the futures and forwards and suggest with reasons which one you would prefer to hedge the currency risk. (8)

One of the investment analysts working for you has produced a report which states that one of the conglomerate companies that is part of the NSE-50 is going to make a significant announcement regarding the acquisition of a beleaguered software company that will have synergic effects with the company's existing lines of business and will have significant impact on its future business. The shares of both companies are part of your portfolio. The stock market has to some extent discounted this news as is reflected in the stock price movements.

- b)** Explain the key uses of Options (5)
- c)** Determine suitable option strategies to enhance your returns depending upon your view of the likely outcome of the acquisition, explaining your reasons for the strategy. Illustrate your strategy by a suitable pay-off diagram. (10)

**[23]**

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